REMARKS

In view of the foregoing amendments and the following remarks, Applicants respectfully request reexamination of the present application. Claims 62, 69-71, 76, 82-85, 87, 89, 91 and 92 have been amended, Claim 77 has been cancelled and no new claims have been added.

Applicants have made numerous revisions to the specification. Most of these revisions are substantially identical to those made in the parent application (U.S. Patent Application Serial No. 09/800,426). No new matter has been added.

OBJECTIONS

The Examiner has objected to the disclosure because on page 47, line 25; page 53, line 16 and page 55, line 16, the variables X and Y are not defined. Applicants have amended the specification to remove these variables and removal of this objection is requested.

The Examiner states that the specification teaches $(Y,Gd)BO_3$ and it is unclear if both yttrium and gadolinium must be present or if only one is present, i.e. does (Y,Gd) mean $Y_{1-x}Gd_x$, where $0 \leq x \leq 1$ or $0 < x < 1$. Applicants respectfully submit that one of ordinary skill in the art would recognize that this formulation represents a borate compound where either yttrium, gadolinium or both can be present. Therefore, removal of this objection is requested.

The Examiner states the X variable in Table V is not defined and appropriate correction is required. Applicants have amended Table V to remove this variable and removal of this objection is requested.

The Examiner has objected to the specification as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). The Examiner states that the correction of the following is required: the size range of Claim 76, where the average particle size is not greater than about 5 microns is not taught in the specification and the specification teaches a preferred lower limit of about 0.1 micron. Applicants have amended the specification at page 55 to more specifically

recite that 0.1μm is a preferred lower limit and that the present invention is not to be construed as limited thereto. Therefore, removal of this objection is requested.

The Examiner also states that the subject matter of Claim 85 is not found in the specification. The specification has been amended accordingly at page 65, and removal of this objection is requested.

The Examiner states that there is no teaching in the specification of mixtures of the taught red phosphors as claimed in Claim 92 or of the mixture of the taught green phosphors as claimed in Claim 92. Applicants have amended the specification at page 65, and removal of this objection is requested.

CLAIM REJECTIONS – 35 USC 112

The Examiner has rejected Claims 69, 71, 76 and 78-92 under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), as the time the application was filed, had possession of the claimed invention.

The Examiner states that the specification teaches $BaMgAl_{10}O_{17}$:Eu or Mn. The Examiner also states that Claims 69, 71, 82, 83 and 92 teach $BaMgAl_XO_Y$:Eu or Mn and this discrepancy as to the formula needs to be corrected. Applicants have amended the claims to simply recite a barium magnesium aluminate compound and removal of this rejection is requested.

The Examiner states that the specification teaches on page 58 that the phosphor particles are spherical and Claims 76 and 78-92 do not teach this limitation. The Examiner states that this discrepancy needs to be corrected. Applicants have amended the specification at page 58 to clarify that spherical morphology is merely preferred and removal of this rejection is requested.

The Examiner has rejected Claims 67, 69-71, 82-85, 87 and 89-92 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner states that Claim 67-71, 82-85 and 92 are indefinite since the variables X and Y are not defined. Applicants have amended these claims to remove the variables and removal of this rejection is requested.

The Examiner also states that Claims 67 and 90-92 are indefinite since it is unclear if both yttrium and gadolinium must be present or if only one is present, i.e. does (Y,Gd) mean $Y_{1-x}Gd_x$, where $0 \leq x \leq 1$ or $0 < x < 1$. As is discussed above, Applicants respectfully submit that one of ordinary skill in the art would recognize that this borate compound can include yttrium, gadolinium or mixtures thereof. Therefore, removal of this rejection is requested.

The Examiner states that Claims 83, 85, 87, 89 and 91 recites the limitation "said excitation source" and that there is insufficient antecedent basis for this limitation in these claims or in Claim 76 from which they depend. Applicants have amended the dependent claims accordingly and removal of this rejection is requested.

DOUBLE-PATENTING REJECTIONS

The Examiner has rejected Claims 62-64, 68, 72, 73, 76-81, 86 and 87 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 6, 124-127 of U.S. Patent No. 6,180,029 by Hampden-Smith et al. The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the plasma display panel claimed in the patent has the same structure as that claimed in this application and the phosphors in the patented claimed panel has the same compositions and an average particle and crystallite size and distribution which overlaps and falls within the claimed ranges. The Examiner also states that it is well known in the art that the excitation source in plasma display panels is xenon gas, thus the patented and claimed panels would be expected to contain xenon gas as the excitation source. The Examiner states that Claim 6 teaches the amount of activator in Zn_2SiO_4: Mn and this amount falls within the range claimed in this application.

The Examiner has also rejected Claims 62-69, 74 and 75 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 19-27 of U.S. Patent No. 6,197,218 by Hampden-Smith et al. The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed fluorescent lighting element of the patent suggests that claimed in this application.

The Examiner has rejected Claims 62-64, 72, 73 and 76-81 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 8-14 and 30-35 of U.S. Patent No. 7,005,085 by Hampden-Smith et al. The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the plasma display panel claimed in the patent has the same structure as that claimed in this application and the phosphors in the patented claimed panel has the same compositions and an average particle and crystallite size and distribution which overlaps and falls within the claimed ranges. The Examiner also states that it is well known in the art that the excitation source in plasma display panels is xenon gas, thus the patented and claimed panels would be expected to contain xenon gas as the excitation source.

Applicants request that the foregoing double-patenting rejections be held in abeyance until otherwise patentable subject matter is agreed upon.

CLAIM REJECTIONS – 35 USC § 102

The Examiner has rejected Claims 76 and 79-81 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,471,112 by Hamon et al.

The Examiner states that this reference teaches a plasma display panel having the claimed structure, where the phosphor particles in the phosphor layer have an average or mean particle size in the range of 0.05-0.5 microns and 90% of the phosphor particles have a diameter that is within 25% of the average particle size. The Examiner also states that the average thickness of the phosphor particles have a diameter that is within 25% of the average particle size and the average thickness of the phosphor layer is about 2 to 3 times the diameter of the phosphor. The Examiner states that the method of producing the

phosphor taught in Col. 6 shows the phosphor are single crystals and thus would have a crystallite size that falls within the claimed range. The Examiner also states that the reference teaches the claimed plasma display panel.

Applicants have amended Claim 76 to recite that the particles are substantially spherical, and have cancelled Claim 77. Therefore, removal of this rejection is requested.

CLAIM REJECTIONS – 35 USC § 103

The Examiner has rejected Claims 78 and 81-92 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,471,112 by Hamon et al. in view of pages 626-629 of the Phosphor Handbook.

The Examiner states that this reference teaches a plasma display panel having the claimed structure, where the phosphor particles in the phosphor layer have an average or mean particle size in the range of 0.05-0.5 microns and 90% of the phosphor particles have a diameter that is within 25% of the average particle size. The Examiner also states that the particle size range overlaps that claimed and that the product claims with numerical ranges were held to have been obvious under 35 USC 103. *In re Wertheim*, 191 USPQ 90 (CCPA 1976); *In re Malagari*, 182 USPQ 549 (CCPA 1974); *In re Fields*, 134 USPQ 242 (CCPA 1962); *In re Nehrenberg*, 126 USPQ 383 (CCPA 1960). The Examiner states that the reference teaches that the panel is trichromic which means the panel contains a red, green and blue phosphor. The Examiner also states that the patent does not teach the composition of the red, green and blue phosphors in the panel, however, The Phosphor Handbook teaches the red, green and blue phosphors conventionally used in plasma display panels in the list on pages 628-629. The Examiner concludes that one of ordinary skill in the art would have found it obvious to use Y_2O_3:Eu or (Y,Gd)BO_3:Eu as the red phosphor, Zn_2SiO_4:Mn or $BaAl_{12}O_{19}$:Mn as the green phosphor and $BaMgAl_{14}O_{23}$:Eu as the blue phosphor, where the amounts of the activators are the amounts which will produce the phosphor. The Examiner states that this expected amount at least overlaps the claimed amounts which are also the amount to activate the phosphor and while the patent teaches the plasma display panel contains neon gas, the Phosphor Handbook teaches that the neon gas is conventionally mixed with xenon gas in plasma display panels and it is the

xenon gas that acts as the excitation source in the panel. The Examiner concludes that one of ordinary skill in the art would expect and/or find it obvious to use xenon mixed with neon as the gas in the taught panel and the references suggest the claimed panel.

Applicants have amended independent Claim 76, upon which these claims depend, to incorporate the limitation of Claim 77. Therefore, removal of this rejection is requested.

The Examiner has rejected Claims 62-65, 73, 74 and 76-78 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,725,800 by Huguenin in view of the Phosphor Handbook.

The Examiner states that the patent teaches plasma lamps and screens comprising phosphor particles and a gas excitation source. The Examiner also states that the Phosphor Handbook teaches plasma screen, which is another name for plasma display panels, conventionally have the claimed structure and contains xenon as the excitation gas and that plasma lamps conventionally contain xenon or mercury as the gas excitation source. The Examiner concludes that one of ordinary skill in the art would expect the taught plasma systems, which appear to be conventional systems, to have the claimed structure and to contain the claims gases as excitation gas. The Examiner states that the patent teaches the phosphor particles are spherical, have crystallite size in the claimed range, an average particle size range in the range of 2-6 microns, which falls within and overlaps the claimed range and a dispersion index is less than 0.4, which suggest a maximum size range that overlaps the claimed range, absent any showing to the contrary. The Examiner also states that product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 U.S.C. 103. *In re Wertheim*, 191 USPQ 90 (CCPA 1976); *In re Malagari*, 182 USPQ 549 (CCPA (1974); *In re Fields*, 134 USPQ 242 (CCPA 1962); *In re Nehrenberg*, 126 USPQ 383 (CCPA 1960). The Examiner states that the references suggest the claimed device and plasma display screens.

With respect to independent Claim 62, upon which Claims 63-65, 73 and 74 depend, has been amended to recite that the phosphor particles are selected from the group consisting of Y_2O_3:Eu, (Y, Gd)BO_3:Eu, Zn_2SiO_4:Mn, barium aluminate and doped barium magnesium aluminate. Huguenin merely discloses the production and use of

phosphate particles. Therefore, removal of this rejection with respect to these claims is requested.

With respect to Claims 76-78, Applicants have amended independent Claim 75, upon which these claims depend, to incorporate the limitation that the phosphor particles include a host material selected from the group consisting of oxides, silicates, aluminates and borates. Huguenin merely discloses phosphate compounds and does not suggest any other phosphor compounds. Therefore, removal of this rejection is requested.

The Examiner has rejected Claims 62, 63, 66, 68, 70, 72, 74 and 75 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 5,811,924 by Okumura et al. in view of the Phosphor Handbook.

The Examiner states that this patent teaches a fluorescent lamp, such as a LCD backlight, comprising mercury gas as the excitation source and spherical phosphor particles have a size larger than 0.3 micron. The Examiner also states that these ranges overlap the claimed ranges and product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim*, 191 USPQ 90 (CCPA 1976); *In re Malagari*, 182 USPQ 549 (CCPA 1974); *In re Fields*, 134 USPQ 242 (CCPA 1962); *In re Nehrenberg*, 126 USPQ 383 (CCPA 1960). The Examiner states that the thickness of the phosphor layer is 0.1-100 microns (Col. 12, lines 50-51), which overlaps the claimed range. The Examiner also states that Col. 9, line 64 through Col. 10, line 6 teach the phosphor can be the same as those used in general fluorescent lamps, such as silicates, aluminates and rare earth oxides and pages 378 and 393 of the Phosphor Handbook teaches these phosphors can be Y_2O_3:Eu, Zn_2SiO_4:Mn, $BaAl_8O_{13}$:Eu.

Okumura et al. discloses a method for making phosphors utilizing a thermal plasma to heat raw materials to a high temperature. The resulting powder includes ultrafine particles (size less than 200 nanometers) and larger, spherical particles. The larger spherical particles are "secondarily produced" with the ultrafine particles. (See Col. 9, lines 50-56 and Col. 10, lines 55-65). The ultrafine particles are used in an undercoat layer (Col. 9, lines 39-41) and the spherical particles can be used in a luminous layer (Col. 10, lines 55-65).

Thus, Okumura produces a bimodal size distribution phosphor powder, which used in different layers in a fluorescent lamp. There is no disclosure or suggestion by Okumura that the phosphor powder in either layer has a narrow size distribution where at least about 80 weight percent of the particles are not larger than two times the average particle size. Further, there is no disclosure or suggestion that the ultrafine particles (those having a size less than 200 nanometers) are spherical in shape. Therefore, removal of this rejection is requested.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecute and or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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